MARINE REVIEW.

VOL. XIV. CLEVELAND, O., SEPTEMBER 10, 1896. No. 11.

All Records Broken in the Freight Movement.

Figures now at hand regarding the amount of freight moved on the lakes to Sept. 1 prove conclusively that the boom of last fall, which resulted in $1.75 a ton being paid on ore from the head of Lake Superior to Ohio ports, was a bad thing for the vessel interests. It was prompted by a combination of circumstances that caused vessel owners to lose sight of conditions which have now changed every thing. Reports from all upper lake shipping ports to the Cleveland association of ore sales agents show a total movement of 7,104,092 gross tons of ore to Sept.1, as compared with 6,672,051 tons on Sept. 1 a year ago, or an increase of 432,041 tons. This movement of ore is at the rate of eleven million tons annually. Eleven million tons is about the maximum capacity, when in full blast, of all furnaces using Lake Superior ores. There was no let-up in the amount of freight moved on the lakes during August. In addition to this maximum movement of ore, the grain shipments are unprecedented. From Lake Superior alone the shipments of grain of all kinds aggregated to the first of September 45,765,257 bushels, against only 11,671,987 bushels on the same date a year ago. Soft coal shipments to Lake Superior during August footed up 425,275 tons and the total movement to Sept. 1 is 1,727,071 tons, or nearly three-quarters of a million tons more than had been moved at this time a year ago. The hard coal movement to Lake Superior is also greater than it was a year ago, the excess amounting to 28,250 tons. These figures are all accurate, as they are made up from the monthly statements issued by the canal authorities. The freight movement as a whole is best understood from the statement of aggregate tonnage through the canals, which shows that on Sept. 1 Lake Superior business, which aggregated 10,678,859 tons, was 2,000,000 tons greater than on the same date a year ago and nearly 4,000,000 tons greater than on the same date in any year previous to 1895.

In considering these figures due regard must be given to the disturbed condition of business throughout the country on account of politics, but still we have handled a volume of freight that is, with Lake Michigan traffic added to that of Lake Superior, full 3,000,000 tons greater than in any previous year, and yet the range of lake freights is about the lowest ever known. This situation warrants a careful study of all plans not only for the balance of the present season but also for next year. The influence of larger vessels and deeper channels has been underestimated. What will it be next season with even 18 feet of water afforded by the so-called 20-foot channels?

A race in New York harbor, recently, between the steamer Monmouth and M. C. D. Borden's yacht Sovereign, has attracted a great deal of attention. Barring the sound steamer City of Lowell, the Monmouth is reputed to be the fastest steamer in the vicinity of New York, but she was beaten by the Sovereign over a course of about an hour's steaming. The Sovereign was designed by J Beavor Webb of New York and built by the J. N. Robbins Co. of South Brooklyn. She is 212 feet long on the water line, 250 feet 6 inches over all, and 28 feet breadth of beam. There are two triple expansion engines with cylinders 15, 24 and 39 inches diameter and 21 inches stroke of piston, built by the W. & A. Fletcher Co. of Hoboken, N. J. These engines will, it is claimed, develop 2,500 indicated horse power. They are supplied with steam at 225 pounds pressure by two boilers of the Babcock & Wilcox type. The grate surface of each boiler is 72 square feet and the heating surface of each 3,500 square feet, giving a ratio of 48 to 1.

Sir W. G. Armstrong & Co., leading British ship builders, are now employing about 19,000 men and boys. About $7,500,000 was paid in wages by this firm during the past year. There are 1,300 guns in course of manufacture at its works and fourteen big war ships, to say nothing of orders for merchant vessels. The war ships range from 3,000 to 12,000 tons and include one armor-clad battleship, four first-class armored cruisers, six fast protected cruisers, two armor-clads and one third-class cruiser.

Supreme Court Decision on the Harter Bill.

The United States supreme court, in the case of the Delaware, 161 U. S., page 459, has put an end to all controversy as to the applicability of the Harter bill, so-called, to relations other than of carrier and shipper. It was a collision case in which the defense was sought to be made that the act of Feb. 13, 1893, (Harter bill) absolved the vessel at fault from liability. The case went to the supreme court on certificate, and it was there decided that that act did not and was not intended to cover such case. The court holds that "it is entirely clear that the whole object of the act is to modify the relations previously existing between the vessel and her cargo." The court reviews the act generally and the causes leading to its adoption. It is a matter of common knowledge that vessel owners were want to insert in bills of lading stipulations against liability for damages arising from a variety of causes, and this was kept up, meeting the decisions of the courts, until the common law liability of the carrier was little more than a name.

In the opinion is set out a petition addressed to the Marquis of Salisbury by the Glasgow Commercial Trade Association, and subsequently embodied in a report of the committee on interstate and foreign commerce of the House of Representatives. The petition states that this exemption from liability, under which they were obliged to ship, had been carried to such an extent as to be "unreasonable and unjust," and to exempt the carrier "from almost every conceivable risk and responsibility." As a "striking illustration" of this is mentioned a bill of lading used by some lines, "actually giving the ship owners a right to sell the goods entrusted to them for carriage, not only for the freight upon the goods themselves, but for all debts due, either by the shippers or the consignees of such goods, to the carriers or their agents, though these debts may have arisen on contracts unconnected with the carriage of such goods." To meet these and similar difficulties, the act of Feb. 13, 1893, was passed, the first and second sections of which make it unlawful to insert in any bill of lading a stipulation against liability "for loss or damage arising from negligence, fault or failure in proper loading, stowage, custody, care or proper delivery," or to relieve against the obligation to exercise due diligence to properly equip, man, provision and outfit the vessel, make her seaworthy, carefully handle and stow her cargo. Section three then provides:

"That if the owner of any vessel transporting merchandise or property to or from any port in the United States of America shall exercise due diligence to make the said vessel in all respects seaworthy and properly manned, equipped and supplied, neither the vessel, her owner or owners, agent or charterers, shall become or be held responsible for damage or loss resulting from faults or errors in navigation or in the management of said vessel, nor shall the vessel, her owner or owners, charterers, agent or master, be held liable for losses arising from dangers of the sea or other navigable waters, acts of God, or other public enemies, or the inherent defect, quality or vice of the thing carried, or from insufficiency of package, or seizure under legal process, or from loss resulting from any act or omission of the shipper or owner of the goods, his agent or representative, or from saving or attempting to save life or property at sea, or from any deviation in rendering such service."

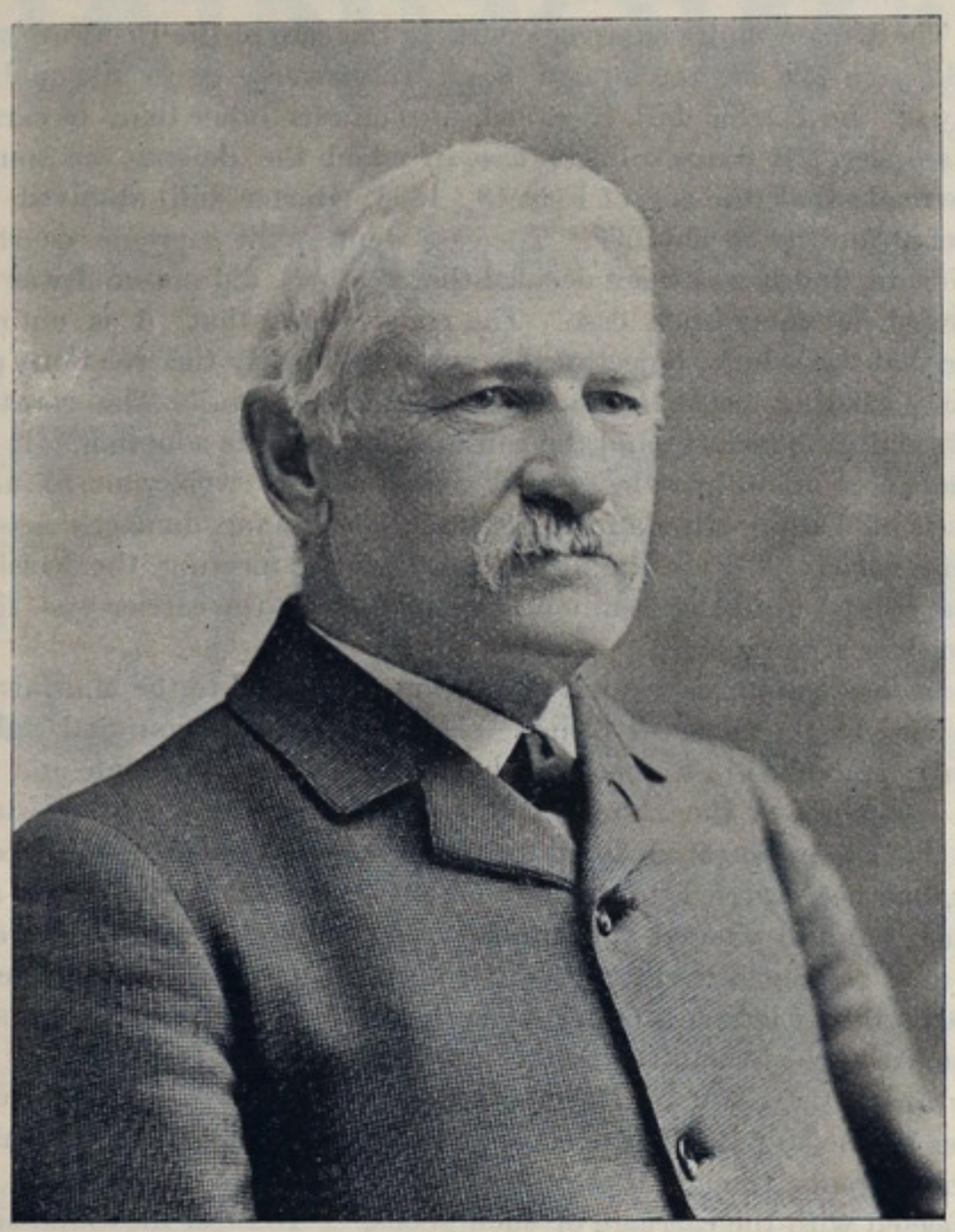
Taking the whole act the court says: "These provisions have no possible application to the relations of one vessel to another, and are only a re-enactment of certain well-known provisions of the common law applicable to the duties and liabilities of vessels to their cargoes."

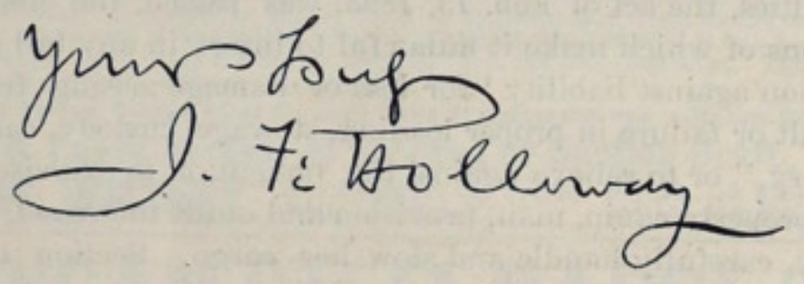
Lieut. J. B. Cavanaugh, corps of engineers, U. S. A., who made many friends while temporarily in charge of the Detroit office made vacant by the death of Gen. Poe, has been transferred to Mobile, Ala., under Major Rossell. He will be succeeded by Lieut. J. F. McIndoe, who has been with Capt. Kingman.

A. U. Sheldon, naval architect with the Globe Iron Works Co., is in Europe. His trip will be an extended one.

Death of J. F. Holloway.

To people of the lakes, J. F. Holloway, who died at his summer home at Cuyahoga Falls, O., a few days ago, was best known as the leading spirit in the Cuyahoga Steam Furnace Co. of Cleveland, a concern that equipped many lake vessels with machinery previous to 1887, when the promoters of the Cleveland Ship Building Co. bought up the works and established a more extensive plant. But the old





Cuyahoga works was in its time quite an institution and had seen its best days under Mr. Holloway's management. He was in charge of these works, first as superintendent and engineer and later as president, for twenty-seven years. Its product included marine engines, Bessemer steel plants, blowing engines, steam hammers and other heavy machinery.

Mr. Holloway was seventy-one years of age but was actively employed up to the time of his death. Bright's disease was the immediate cause of his death but he was ill for only two weeks. He was engaged with two engineering concerns since the sale of the Cuyahoga works—Henry R. Worthington of New York and the Snow Steam Pump Co. of Buffalo, the latter for only a short time past. Probably no engineer in this country was better known or more highly respected among men of the profession. His contributions to the literature of engineering societies and to engineering journals was very extensive, and he was a constant and welcome attendant at meetings of engineers. In 1884 and 1885 he was president of the American Society of Mechanical Engineers, and for a number of years was a vice-president of the American Institute of Mining Engineers, holding that office at the time of his death. While a resident of Cleveland he was president of its Civil Engineers' Club, and afterwards, on going to New York, was elected president of the well-known Engineers' Club of the Metropolis.

Immense Freight Movement—Lake Superior Traffic.

Contrary to expectations, there was an increase during the past month of 30,000 tons over August of last year in the amount of freight carried through the Canadian and American canals at Sault Ste. Marie. Heavy grain shipments are the great factor in the situation, and it is plainly evident that the influence of big ships and deeper draft has been underestimated on all hands. The official figures from both canals, covering the business of Lake Superior to Sept. 1, are amazing. The ore movement during August was restricted in only a moderate way and is still far ahead of the movement on Sept. 1 in any previous year, while wheat shipments foot up 32,732,420 bushels, against only 11,655,128 bushels on Sept. 1 a year ago. The total shipments of grain of all kinds, wheat, corn, etc., through the canal to Sept. 1 is 45,765,257 bushels, against 11,671,987 bushels on the corresponding date a year ago. During August just passed, 425,275 tons of soft coal went to Lake Superior, and the shipments of soft coal for the season to Sept. 1 are nearly three-quarters of a million tons greater than they were at this time a year ago. The tables that follow show gains proportionately heavy in the movement of other lines of freight.

MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

ITEMS.	To Sept. 1, 1896.	To Sept. 1, 1895.	To Sept. 1, 1894.	To Sept. 1, 1893.
Coal, anthracite, net tons.....	224,888	196,638	288,313	1,921 803*
Coal, bituminous, net tons ..	1,727,071	1,063,476	934,827	
Iron ore, net tons.....	5,826,10	5,484,152	4,206,894	2,616,633
Wheat, bushels.....	32,732,420	11,655.128	13,517,730	26,021,018
Flour, barrels.....	4 321,426	4,678,742	4,524,048	3,719,679

The total movement of all kinds of freight, shown below, to and from Lake Superior to September 1, 1896, is 10,678,959 tons, nearly two million tons greater than to September 1, 1895, and nearly four million tons greater than on the same dates in 1893 and 1894.

REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO SEPTEMBER 1 OF EACH YEAR FOR FOUR YEARS PAST.

EAST BOUND.

ITEMS.	Designation	To Sept. 1, 1896.	To Sept. 1, 1895.	To Sept. 1, 1894.	To Sept. 1, 1893.
Copper	Net tons...	76,510	68,770	61,165	56,023
Grain, other than wheat	Bushels....	13,032,837	16,859	1,314,603	1,507,743
Building stone.....	Net tons...	12,833	13,820	15,595	14,567
Flour.....	Barrels.....	4 321,364	4,676,592	4,523,295	3,718,514
Iron ore.....	Net tons...	5,826,100	5,484,152	4,206.894	2,616,633
Iron, pig.....	Net tons...	17,424	15,809	13,481	14,375
Lumber.....	M. ft. b.m.	446,023	495,332	435,633	326,259
Silver ore.....	Net tons...	140	100	412	1,090
Wheat	Bushels....	32,732,420	11,655,128	13,517,730	26,021,018
Unclassified freight.	Net tons...	125 796	99,354	83,727	79,455
Passengers.....	Number....	15,672	12,248	10,45	6,768

WEST BOUND.

Coal, anthracite.....	Net tons..	224,888	196,638	288,313	1,921,803*
Coal, bituminous.....	Net tons..	1,727,071	1,063,476	934,827	
Flour.....	Barrels....	62	2,150	753	1,065
Grain	Bushels...	1,1 9	31,650	2,500	4,650
Manufactured iron..	Net tons..	55,158	45,902	14,907	46,076
Salt	Barrels....	130,512	157,720	99,876	104,213
Unclassified freight.	Net tons..	193,696	167,150	138,675	152,537
Passengers.....	Number..	16,232	13,119	10,926	7,699

*Previous to 1894 anthracite and bituminous coal were not reported separately.

SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To Sept. 1, 1896.	To Sept. 1, 1895.	To Sept. 1, 1894.	To Sept. 1, 1893.
West bound freight of all kinds, net tons.....	2,228,829	1,522 849	1,291,711	2,165,7v8
East bound freight of all kinds, net tons	8,450,130	7,335,299	5,595,113	4,527,580
	10,678,859	8,858 148	6,886,824	6,693,288

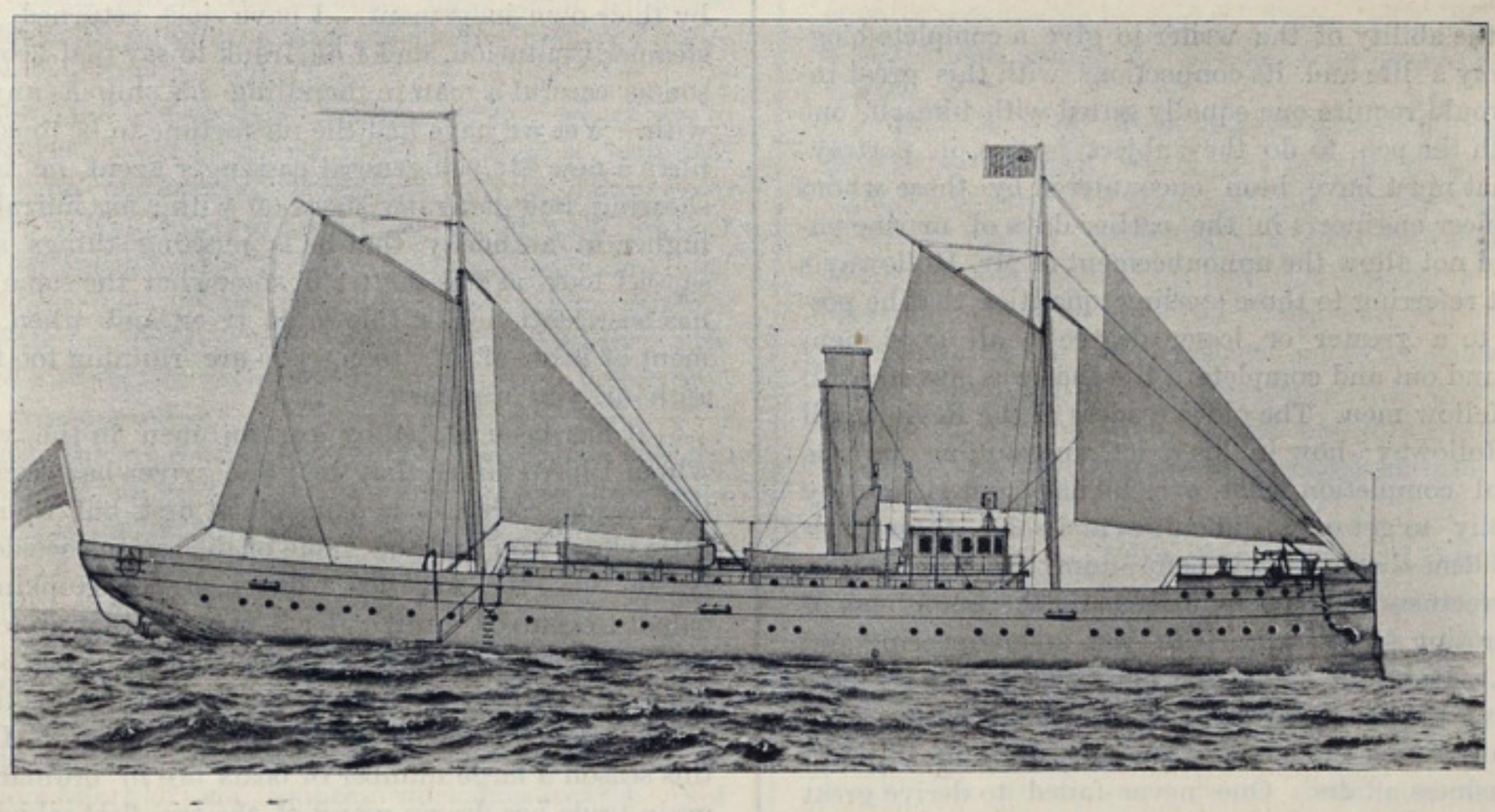
The total number of vessel passages to Sept. 1, 1896, was 12,925 and the registered tonnage 11,831,398.

Revenue Cutter Gresham.

A picture of the new revenue cutter Gresham, made from drawings used in the construction of the ship, is presented on this page. The Gresham will be launched at the ship yard of the Globe Iron Works Co., Cleveland, at 2:30 p. m., Saturday, the 12th. A few of the treasury department officials will probably be in attendance. Two other vessels of this type are now being built on the coast for the revenue cutter service, and it is expected that within a short time the service will be enabled to call for bids on two more for the lakes, for which partial appropriations have been secured. These ships are of the first class in the cutter service and they are costing the government about $175,000, including expense of preparing plans, supervising construction, etc.

The Gresham is 205 feet over all, 188 feet water line, 32 feet beam and 16 feet depth of hold. Her displacement at a mean draft of 10 feet 10 inches will be about 900 tons. She is expected to maintain an average speed of 16 knots an hour when the engine is developing about 2,000 horse power. She is built of the best open hearth steel, the requirements for which were that it should have a tensile strength of at least 55,000 pounds per square inch and an elongation of not less than 25 per cent. in a length of 8 inches. Samples cut from the plating were bent cold, flat over on themselves, without showing signs of fracture. The cabin and officers' quarters are located in the after part of the vessel. The crew's quarters are forward, while the ship's galley, as well as the carpenter shop, engineer's work shop, armory, executive officers, office, bath rooms, etc., are located in an iron house on the main deck, in the forward part of which is the pilot house and chart room. An electric light plant capable of producing a current of 100 amperes at a pressure of 80 volts will be located in the upper engine room. A search light of 25 amperes capacity will be carried on the pilot house. The armament will consist of a battery of rapid firing guns, and provision will be made for carrying a torpedo outfit. The vessel will be supplied with steam steering gear, steam capstans and steam windlass and will be heated throughout by steam.

Engines are of the triple expansion type, having cylinders 25,37½, and 56½ inches diameter and a common stroke of 30 inches. The high pressure cylinder is fitted with a piston valve and the intermediate and low pressure cylinders each with a double ported slide valve, all operated by the Stephenson link motion with double bar links. The crank, intermediate and propeller shafts are of forged mild open-hearth steel, made by the Bethlehem Iron Co., as are also the front columns, piston and connecting rods. There is a surface condenser, containing about 3,000 square feet of cooling surface, which forms part of the engine housing. There is also a pair of vertical, independent, single-acting air pumps, operated by one steam cylinder; the pumps discharge with a feed tank. The circulating pumps are also independent and of the centrifugal type. The main and auxiliary feed pumps are of the vertical duplex type. Steam is supplied by four single ended boilers of the Scotch type, each 11 feet 6 inches long. Each boiler has two corrugated furnaces, the total grate surface being 185 square feet. The total heating surface is 5,300 square feet. The propeller is of bronze, 13 feet pitch and four-bladed. When the engine is making 160 revolutions the calculated speed will be about 20.52 knots, from which deducting the liberal allowance of 20 per cent. for slips, the actual speed of the vessel will be about 16.42 knots maximum. The coal capacity is such as to give the new cutter a steaming radius of 2,500 knots at full speed and 4,000 knots when steaming at the more economical speed of 10 knots per hour with one boiler in use.



NEW U. S. REVENUE CUTTER GRESHAM.

Another Propeller.

Alfred Fornander is an inventor known somewhat among eastern ship builders. He has of late submitted designs for a new propeller to competent judges, and the Maritime Register of New York intimates that his invention is of far more importance than the numerous efforts that have been made to improve upon present types of propellers. Mr. Fornander is not as yet prepared to submit his plans to the public but he says:

"Fulton in his greatest dreams could not have imagined the wonderful development that would follow upon his invention. It is now less than a century ago (1807) since the famous inventor made his trial trip on the Hudson with the little crude steamboat, and to-day we have a myriad of steaming vessels, thousands of which are luxuriously fitted up and large enough to be called floating palaces. Still by all this one must not think that we have reached the climax of perfection in steam propulsion. On the contrary the improvements yet to be made may be of still higher order than the achievements up to date. When the great Swede Ericsson gave us the propeller, it was not at all like the one now in use. It was somewhat similar to an ordinary sprocket wheel on a modern bicycle with a multitude of blades fastened to the rim. Step by step it has assumed its present shape, the number of blades reduced more and more, until it is now found that for a small-sized one, at least, a two-bladed propeller is the most advantageous in practice. The loss of energy by friction against the water is enormous—some figure as high as 53 per cent. In my opinion this can be reduced considerably, say 5 and perhaps 10 per cent., a fact that I imagine myself able to accomplish, and which would mean to an ocean greyhound an addition of one or two knots per hour in speed. Too little attention has really been paid to the lines of this small but all important instrument that does the work one never sees. Not yet protected by patents, I hesitate to publish the exact details of my theory, but as a general view I will state that the improvement depends upon the exact proportions of the size of the screw to the dimensions of the vessel, and to the power of the machinery and capability of speed; also on the way the screw cuts and leaves the water, and furthermore, of course, on the construction of pitch."

On the Death of J. F. Holloway.

On the banks of the Cuyahoga, at a place now occupied by a great ship building plant, there was located at one time one of Cleveand's principal engineering establishments, that has ultimately been the means of developing, to its present extent, the vast ship building industry of the great lakes. The Cuyahoga Steam Furnace Co.'s works in its palmy days was a scene of great activity, employing hundreds of skilled mechanics. Its reputation for the excellence of its production, both in design and workmanship, was not confined to the lakes alone, but extended to the Atlantic coast as well. It enjoyed this reputation for a long period of years, until it had to succumb to the march of progress and give place to the more modern steel ship building and marine engineering plants as we see them at the present time.

There was one long connected with the Cuyahoga Furnace Co., to whom, for his skill as an engineer, and his ability as a manager, is due the credit of building up an industry that has contributed largely to Cleveland's present prosperity in ship building, and given her a reputation that is world-wide for the extent and quality of her productions in this line. But few of the present readers of the Review will recognize the fact that in the death of Mr. J. F. Holloway the engineering fraternity has lost one who, at one time, was the brightest engineer on the great lakes; who by his industry, ingenuity and engineering skill assisted more than any man in laying the foundation of what is now regarded as the greatest merchant marine on any inland sea.

It is not within the ability of the writer to give a complete biography of Mr. Holloway's life and its connections with this great inland marine, for it would require one equally gifted with himself, one having his talent with the pen, to do the subject justice, in portraying the difficulties that must have been encountered by those whom we now term the pioneer engineers in the earlier days of marine engineering. But I could not allow the announcement of Mr. Holloway's death to pass without referring to those sterling qualities that he possessed; that are held to a greater or lesser degree by all good men, and are needed to round out and complete a life that was already full of good deeds to his fellow men. The older readers of the Review will best remember Mr. Holloway; how in his quiet, unassuming way he carried to a successful completion what ever he had undertaken, by his ability and capactiy to get over difficulties and solve those intricate engineering problems that were laid before him, and which afterwards proved the correctness of his conclusions and the soundness of his judgment, by operating successfully, both from an engineering and financial stand-point. It would seem that his disposition must have been of a most pleasing kind. He always met his friends with a genial smile and a warm grasp of the hand, expressing a kindly interest in their social and business affairs. One never failed to derive great benefit from his advice and pleasing suggestions, and yet the man of this disposition had the ability and capacity to manage successfully large engineering establishments, employing hundreds of men, whose confidence and esteem he enjoyed. He was held in the highest regard by his employes, and up to the time of his death had lost, among those still living, none of the good feeling that was due him from early days.

In his latter years Mr. Holloway met with reverses and financial losses that would have broken down constitutions stronger than his, but with all of this he had the same kindly smile and words of cheer that always greeted his friends, and which will long be remembered by those who had the good fortune of an intimate acquaintance with him. He had a rare fund of humor about him that was displayed when occasion suited, and which was greatly enjoyed by his friends, and as he used to say himself, "a little fun now and then was enjoyed by the best of men." At the banqueting board he was always accorded the seat of honor, and he succeeded invariably in holding his hearers by a gift of eloquence and a power of description surpassed by few men in the profession. By his dry humor and witty sayings, and by sly hits at individual members of the company, he could bring out broad smiles, and at the same time disarm any intention of personalities, so that it was enjoyed by all, no matter who he hit. Few men who stood at the head of the profession as he did would deign to notice the younger engineers, but not so with Mr. Holloway. He extended a hand to them on all occasions and by words of encouragement did more than anyone I have ever known to draw out the younger element, and by making them acquainted with the leaders he caused them to feel that they were nearing the top of the ladder themselves. He seemed pleased with efforts of this kind at all times, even when it was not convenient for him to do so. He was ready to speak well of young men in the profession when he deemed them worthy of it, and many of the prominent engineers of to day are indebted, more than they can tell, to Mr. Halloway for success in life. On more than one occasion it has been insisted that he be made aware of truths of this kind, but he modestly disclaimed knowledge of having done anything worthy of mention. The fact remains, just the same, and those who knew him intimately are certain that it was very gratifying to him to feel that his humble efforts in this regard resulted in some good. He was often heard to say that in his younger days he suffered much from "timid feelings," and he felt that if he ever succeeded in gaining confidence in himself, he would do what he could to correct that feeling in others.

Cleveland, Sept. 9, 1896. W. M.

Criticism of Sault River Regulations.

Editor Marine Review:—This matter of Sault river regulations is getting to be quite serious with boats that have been so unfortunate as to fall under the ax. I appreciate the fact that the rules are an excellent thing, but the way they are enforced seems somewhat inconsistent. Of course it is the same in this as in other matters, all must suffer, for there are always a few reckless captains who bring discredit on all. I do not think Capt. Davis or his men have any way under the present arrangements of determining, with any degree of accuracy, the speed of a vessel—whether it is 5, 7, or 10 miles an hour—only by their own judgement. I have just returned from Duluth on the steamer Centurion, and I am frank to say that I consider Capt. Hutcheson as careful a man in handling his ship as any man I ever sailed with. Yet we have had the misfortune to be fined. When a railroad hires a new $10,000 general passenger agent, he is anxious to make a showing, and generally starts off with a big hurrah to prove to officials higher in authority that he is pushing things along. In a certain sense, I look at this matter in somewhat the same light. Capt. Davis has been stationed on the Sault river, and when, solely on the judgment of some of his men, you are running too fast, or over 7 miles an hour, you are fined.

It has been stated by certain men in the vessel business with whom I have talked that the "Soo" river has been free from accidents this season. This looks plausible at first, but when you look into it a little closer you find that none of the serious accidents in the river last season, viz., the America, Corsica, Fryer, Hopkins or the Nyanza accidents, occurred until after Sept. 1, so that up to that time last season the river was as free from accidents as it has been this season. Another point which should not be lost sight of is that last year nearly all the boats outside of the lines were trading to Lake Superior, while this season a large number of boats are in ordinary and the Chicago grain trade has drawn many of the ore fleet which have always been exclusively in the Lake Superior trade.

These facts simply go to show that other causes besides the eagle eye of Capt. Davis are in a measure responsible for the apparent safe navigation of the "Soo" river during the present season. If a telephone line was established with a station on shore opposite the turning can at the northern end of Mud lake, connecting with another station, say at the northern end of the dyke, or just above there in Hay lake, and if we then had a time limit placed on the passage of this portion of the river, with the same thing done between the "Soo" and the lower end of Sugar island cut, captains would know just what was expected of them. Then if the rules were violated, the captains could be made personally responsible, and after paying one fine the same man would probably not be found at fault again. As it is now a captain has nothing to gauge himself by, only to run under slow check and run the chance of being fined. H. E. Schmuck.

Springfield, Mass., Sept. 3, 1896.

The writer of the above communication is interested in the steamer Centurion. He has given a great deal of attention to the lakes and is well informed on shipping matters here.—Editor.

On Sept. 1 the Calumet & Hecla Mining Co. paid another dividend of $5 a share, making $20 a share for the present year. The total amount paid in dividends by this big Michigan copper company now foots up $46,350,000.

A dry dock 425 feet long, costing about $86,000 will be constructed by Dougan, Bringham & Cowan at Tacoma, Wash.

Qualifications of Marine Engineers.

The board of trade in England, which in the matter of examinations governing the qualifications of captains and engineers of steam vessels exercises a power similar to that of the steamboat inspection service in the United States, is considering a change in the existing regulations for engineers, which have been inforce for twenty years. Under the present rules the apprenticeship required before a license as second engineer is granted is three years. It is proposed to change this to five years. There are now two grades of engineers. These are second class engineer and chief engineer. It is also proposed to make a third grade, of high order, to be known as extra chief. These proposed changes are prompted by the great advance that has been made of late years in marine engineering, requiring each year men of greater skill. The higher order of qualifications will be based, of course, first on an improved standard among second-class engineers, and it is the rules governing applicants for a license of this kind that are being most thoroughly discussed. The rules proposed now will probably be changed after discussion, but will nevertheless prove interesting to engineers in this country. They are as follows:

1. An applicant for a second-class engineers' certificate must be twenty-one years of age. He must have been employed for at least five years as an artisan on work of a description required in the construction of the engines, boilers, hulls, or machinery of steamships.

2. For not less than three years of that period he must have been employed in some factory or workshop in the making or repairing of steam engines, during which time he must have been employed for not less than eighteen months as fitter or erector, and not more than twelve months in a drawing office.

3. In calculating the five years of artisan service which are to constitute the required apprenticeship, time spent at a technical school where there is an engineering laboratory may be taken into account and accepted as equivalent to artisan service, at the ratio of three years in the technical school to two in artisan service, provided that the applicant was over fifteen years of age and can produce the masters' certificate for regular attendances and satisfactory progress; and provided also that in such case the remainder of the time was not spent in a drawing office.

4. In addition to the apprenticeship as above described, the applicant must have served one year at sea in the engine-room as engineer on regular watch in a steamship carrying at least one engineer holding a board of trade certificate in the foreign trade, or eighteen months in the home or coasting trade. During the whole of that time he must have had on regular watch the responsible charge of the engines or the boilers.

5. Additional service at sea as an engineer in charge of a watch may be reckoned as equivalent to artisan service, and as affording in every year the equivalent of six months' workshop service. Not more than two years of such service will, however, be allowed to count.

6. Every applicant must produce testimonials of ability as an engineer workman to the satisfaction of the board of trade.

Retarders in Boiler Tubes.

In the boiler shop of the Dry Dock Engine Works, Detroit, one of the officers of the company pointed out to a representative of the Review, a few days ago, a pile of retarders that were being put into the tubes of a big Scotch boiler. These retarders, which are intended to increase the amount of heat transmitted to the tube surface, have been used for some time past, but a peculiarity in the kind now made by the Detroit concern, permits of them being used themselves to clean the tubes. The ends of the retarders, extending a few inches out from the tubes, are split and so bent that they do not permit of the long spiral pieces entering the tube entire. These small ends are like so many pin wheels, and when a force of steam or air is applied to them they will all revolve at a rapid rate, cleansing the tubes of dirt and soot.

"We have patented this improvement on the retarders," said the official referred to. "We are reaching a point in this vessel business on the lakes," he continued, "when any device that will in any way reduce operating expenses will be in demand. We know what we have already done along this line with the Howden hot draft. We find people criticising us for using these retarders, just as we find them declaring that the Howden draft does not come up to the claims made for it, but our critics are usually those whose pockets are not helped on account of our use of things of this kind. It is easy to understand how these retarders increase the amount of heat on the tube surface. The friction upon the surface of the retarder aids in stirring up the gases in their passage through the tube, and mixing the hot gases at the centre with the cold film next to the surface of the tube. It will be found, also, that in every horizontal tube there is a tendency for the gases to be cooler at the upper part of the tube, and hotter in the lower part, as from the upper part of the tube the heat is extracted far more readily than from the lower half. The twist of the retarder has the effect of turning over the gas in the tubes as it passes along. Furthemore, the retarder causes a direct radiation of heat to the tube surface. In considering this action of the retarder it may be well to bear in mind the fact that the temperature of the tube surface exposed to the fire in any steam boiler is practically the same as that of the water in contact with it, no matter what may be the temperature of the gases on the other side. Of course the tube surface must be kept clean in order to derive the full advantages of this or any other device of its kind."

Lights, Shoals, Etc.

Some time ago Capt. Andrew Hackett, keeper of the Bois Blanc island light, Detroit river, placed a black stake at the head of that island, to mark a shoal spot where one of the big ore carriers had previously fetched up. This was done under the direction of the Lake Carriers' Association. The buoy has served to keep vessels in deep water during daylight, and now it will be lighted, so as to be equally serviceable by night. There will be two white lights on a small float, similar to those near the boat-house at the foot of the island.

Capt. M. Riley of the steamer Susquehanna reports that on August 26 at midnight, when 1¼ to 1¾ miles S. E. by S. from Gray's reef light-ship, Straits of Mackinac, his steamer touched bottom lightly. It will be readily understood that a shoal at this point may prove disastrous to some vessel. It is in the course of all Chicago traders. The chart shows 30 to 40 feet of water in this vicinity.

Now that the gas buoys that are to be placed in Point au Pelee passage have arrived at Amherstburg, it is expected that officials of the light-house service in Canada and the United States will, within a week or so, have matters so arranged that the buoys can be placed upon their stations.

Why Mechanics Like It.

In our issue of Aug. 27, we printed an article on the "Providence" windlass, showing why the sailors like it, and now we wish to state the reason why mechanics like this windlass. One reason is that it is built on mechanical principals, and it is able to bear the closest scrutiny on these lines. Every mechanic knows that to have a machine durable the strains must be so distributed that they will not rack the machine, and that it is essential to support the machine at the point of the severest strain. Also, that the strength of a shaft lies in the outside of the shaft, rather than in the center, and if a thread is cut in a shaft that it takes away the best part of its strength. Mechanics also understand that vertical engines will last longer than either right angle or hoizontal engines. Also, that a machine must be accessible, so as to be convenient to operate and to take care of. These are the first points that a mechanic would look at, and the "Providence" windlasses have been so long before the public, and have been so thoroughly endorsed, that it proves that for enduring prosperity a windlass must be constructed on mechanical principals, or it will fail to continue to receive the endorsement of the public. Taking the career of the "Providence" windlasses for forty years, it shows that from a mechanical standpoint the windlasses are simply perfect. Ship owners require a windlass to be mechanically correct, as well as convenient in operation. It must be so arranged on mechanical principles that it can be quickly operated, so that in an emergency the ship would not go ashore before the operation could be performed, and any accident can be prevented by being able to let her go or take anchor quickly. The builders of the "Providence" machines court the most thorough investigation from the mechanic and engineer, as well as the ship owner, ship builder and sailor.

It is announced from the New York office of the Fall River line that the double summer service has been discontinued. The steamers Plymouth and Pilgrim have been retired from service for the season, while the Priscilla and Puritan will remain in commission, leaving New York as usual every day at 5:30 p. m.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

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Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of the 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598,72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,755	857,735.13
Sailing vessels	1,100	300,642.10
Unrigged	487	83,081.91
Total	3,342	1,241,459.14

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891	204	111,856.45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
Total	347	335,433,98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation	231	234	219	365	365	365

*1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ½ per cent. of the whole, but largely in American vessels.

Although the race between the steam yachts Enquirer and Say When at Cleveland, recently, has awakened a great deal of interest in pleasure craft of the steam kind, there is a degree of uncertainty about these vessels and the desire to own them that is not satisfactory to yacht builders or the builders of boilers and machinery suited for them. A steam yacht at the best is a rich man's hobby and their owners often tire of them in short order. This is especially the case when one of them is beaten in a race. W. J. White is already preparing to build a sail yacht to compete for the cup recently won by the Canadians at Toledo, and it would not be surprising to hear shortly of his having given up the Say When. Half a dozen wealthy men and families in and around Detroit have steam yachts in which they have taken little interest of late, and which might be bought very much below cost. Mark Hopkins of St. Clair, Mich., who sold the Bonita, a few days ago, to Gen. Torrent of Chicago for just $20, 000, has had two yachts and tired of both of them because of their being beaten by fast freight steamers. The race between the Centurion and the Bonita last fall cost him $5,000 or $6,000. He was so disgusted to think that his own big freight steamer, built to drag iron ore and other coarse freight, had beaten the Bonita that he had her boilers torn out last winter and replaced and the engine overhauled at a large outlay.

Frank S. Manton of the American Ship Windlass Co., Providence, R. I., takes an encouraging view of the business outlook. He says in a letter to the Review: "Business is improving. We have received orders within ten days for three steam towing machines. One of these machines is for the Pennsylvania Company, one is for the Standard Oil Co., and one for the Harlan & Hollingsworth Co., Wilmington, Del. The Wilmington company is building a large tug for the Philadelphia & Reading Railroad Co. The political victory in Vermont will, I believe, be followed by a similar result in Maine next week, and that, in my opinion, ends the silver craze. The gold imports into New York and the increased exportation of grain reassure business men and capitalists, and will result in increased business in the near future."

From one end of the lakes to the other, wherever the question of a change in the present Sault river regulations has been considered, the majority of owners, and with them the underwriters, of course, have decided that there should be no change in the rules during the present season. There are probably good grounds for the claim among some owners and masters that the rules favor slow-going vessels and tows, but as it is now absolutely certain that there can be no change in the rules for the present season, on account of the majority rule, it would seem that all vessel masters should accept the situation for the present, and regulate themselves accordingly in running the river, as it is quite probable that there will be few rebates on fines imposed from this time on.

In the Review of August 13 there was published a set of cards from the engines of the big American line steamer St. Paul, together with data of engine performance, showing a consumption of only 1.22 pounds of coal per I. H. P. per hour. Managers of the big Atlantic liners are not disposed to give out information of this kind, although the Review obtained the cards referred to without resorting to methods other than would be followed ordinarily in seeking any such news matter. Since the cards were published, we have received orders for copies of the issue containing them from all parts of the country and especially from representatives of other Atlantic steamboat companies.

Some of the marine reporters are blaming the steam steerer for collisions and other accidents resulting from the parting of wheel chains on steam vessels. They admit that the steam steerer is a device absolutely necessry on modern steamers but they intimate that it is far from the stage of perfection and attribute the parting of wheel chains to its defects. Their argument is a poor one. The vessel captain who insists upon the examination of wheel chains every trip, and knows that the chains are all right, will not be caught in collisions on account of parting chains.

One Pound of Coal on a Steamship.

The value of one pound of coal at different epochs of steamship evolution, as given by Mr. A. J. McGinnis, president of the Liverpool Engineering Society, has been as follows: In 1840, a pound of coal propelled a displacement weight of .578 ton 8 knots; but the earning weight was only one-tenth of this, 90 per cent. of the displacement representing the hull, machinery and fuel. In 1850, with iron vessels and the screw propeller, a displacement weight of .6 ton was propelled 9 knots by a pound of coal; but the proportion of cargo had risen to 27 per cent., or .16 ton. In 1860, with high boiler pressure and the surface condenser, .82 ton displacement was propelled 10 knots and the cargo was 33 per cent., or .27 ton. In 1870, after the compound engine had come into use, 1.8 tons displacement was propelled 10 knots, and here the cargo formed 50 per cent. of the whole, being .9 ton. In 1885 there were two classes of freight boats. One of these, the "tramp," propelled 3.4 tons displacement 8½ knots, with 60 per cent., or two tons of cargo; at the same time the enormous cargo steamers of the North Atlantic were driving a displacement of 3.14 tons 12 knots, with 55 per cent., or 1.7 tons of cargo. On the modern express bassenger steamers, the cargo weight is down to .09 ton per pound of coal.

Any captain who takes pride in the appearance of his vessel naturally wants a good picture of her. Very few good photographs of lake steamers at regular speed have ever been taken in open water, and therefore a number of captains have paid large sums for oil paintings of their vessels. This is not neceassary now, as the Review has a first-class marine photographer on the Detroit river, who will take a photograph of your vessel, more accurate and artistic than any oil painting. One print, 11 by 14 inches, for $2, and three for $5. Wire or write the Review at once.

"As I was going into Ashtabula with the Coralia, the other day, carrying a cargo of 5,699 net tons," said Capt. Wm. Cumming, "I thought of the first vessel in which I ever entered that port. It was along in the sixties, and although she carried but about 250 tons, she was looked upon as a big vessel in her day. The Coralia's cargo was about equal to twenty-five of the kind that that little vessel would carry. Still, we had a crew of nine or ten aboard. I was one of five men before the mast and there was a captain, two mates and a cook."

On a Voyage to High Latitudes.

Editor Marine Review:—No doubt some of your readers have heard of a pair of elegant, low-pressure, upper cabin, side-wheel steamships that have attracted some attention on Her Majesty's side of the rivers, while passing from Lake Erie to the icy regions of the "Soo." There are men in the steamboat business who say that a couple of good steamers in this part of the Dominion coasting trade would make money, but the service is cheap and I am not dictating to the present management. I have simply jotted down a few notes about the trip and the boat on which I took passage.

Her advertised time of departure was 2:30 p. m., sharp; consequently it was exactly 4:30 when the mate stamped on the hurricane deck and yelled "Leggo!" to the deck hands, who were at that precise moment taking a nod in the two or three easy chairs thoughtfully provided for passengers, the aforesaid passengers standing patiently waiting till forty-three of them could get a whack at the said chairs. After two or three preliminary semi-revolutions the ponderous machinery slowly got under way. The purser raised the window of his office and began to apportion among the passengers, lined up in front of it, the least number of rooms amongst the greatest possible number of passengers. Those who had been there before lined up at once, while those who wanted to make an impression waited to mount their yachting caps, wraps and field glasses, and got left. A stop of a few minutes was made at Walkerville and divers barrels and packages of concentrated hilarity taken aboard, after which things seemed to go much more smoothly. Some said they did not see why such stuff was necessary on a pleasure trip, but they probably lacked experience in such matters. No excursion was ever known to be a howling success without it. On Lake St. Clair a good view was had of the sunken steamers Oceanica and Chisholm. The man who knows it all told all about it. Anybody could see that the Chisholm was on the wrong side of the channel. If he had carried his wheel hard-a-port coming down, he never would have touched the other fellow at all. In four hours after passing Walkerville we had arrived at the St. Clair canal, and towards morning we were at the head of the river. It was learned here that some one had said that it had been blowing on Lake Huron two or three days before, and like a careful man our skipper decided to wait and find out the truth about it. But before the report could be traced up an old lumber hooker came along, and her captain, evidently a desperately reckless fellow, never stopped to ask any questions but went on about his business. Seeing this our skipper said: "Well, if he can go out I can," and though some of the yachting caps and sailor clothes looked rather white in the face, he bravely mounted the bridge, buttoned up his coat, pulled his cap a point more nor-west, and we started out. Lake Huron did not look very much disturbed at our daring to venture ourselves upon it, though certainly our boat did seem a little uneasy. Most of the passengers seemed to be very tired, very few of them caring about getting up to breakfast. The cookery must have been very poor, because most of those who did come to breakfast seemed to have eaten something that disagreed with them. They did not, however, seem to bear any ill will towards anyone on that account but freely gave it up again. In fact there seemed to be a sort of rivalry among them as to who could do the most in that direction. It was not sea-sickness, because all denied it, and one and all agreed that they had never experienced anything like it before. One man said that he was born in England, and had crossed the ocean four times, so he knew what he was talking about. I suggested that he must be mistaken, because if he had crossed four times he would now be on the other side. He said he would see me later and teach me to doubt a gentleman's word. I did not see him again, and I hope he did not feel badly about it.

We reached Goderich about three in the afternoon, having traveled from the head of the river in about nine hours. Goderich is quite a nice quiet little town. Every street in it I believe leads to the town hall. I tried three or four and then quit. This and the absence of sidewalks seem to be the principal features, though I admit that I did afterwards hear one man say that Mackinac wasn't in it with Goderich for picturesque beauty. I don't know what part of the town he was in but if I go that way again I will try and find out.

Our next stop was at Kincardine. The reception given us was enthusiastic, if the number of people who turned out to see us was any evidence. It must have been for that, for there is certainly nothing else to see. But stop! I believe one of the principal attractions of this place is the sunset in the waters which under favorable conditions is never to be forgotten. Kincardine has a monopoly of the sunset business. At this point, as well as at Goderich, the Canadian government has spent immense sums of money in harbor making, but after all the net result is that there is about 11 feet of water in calm weather at each place. We made the run from Goderich to Kincardine in excellent time. The distance is thirty miles and we only consumed four hours in covering the entire distance. This, it will be seen at once, beats walking out of sight, and any one who grumbles at it is a kicker. It will probably be claimed that some of the old-time Lake Erie steamers could beat it but they are gone and not able to speak for themselves. Port Elgin was the next stop, where we arrived in due course. The other course is N. E. ¼ S. We did not remain on deck to see this interesting and bustling town, taking it for granted that our folder had it all "dead to rights."

In the morning we were abreast of Cove island, just outside of Tobermoray, and our minds went back to the pleasant days in "auld lang syne," spent knocking about these waters with Commander "Ted" Dunn, now of H. M. S. Petrel, when the days and strings of fish were long, and the nights and yarns were longer. "Ted" now "catches fishes in other men's dishes." Passing Squaw island, where we and "Ted" once took part in a famous race between rival fleets of fishing boats, we arrived (after awhile) at Killarney. This thriving city (see folder) is named from its resemblance to the place of that name in Ireland. We all recognized the resemblance at once. This is mostly an "Injun" town and once boasted the name of Shebonuoning, which means "where am I at?" Several of the survivors of the once noble red men were seen posing gracefully about the door of the store. Among them we recognized Young-man-not-afraid-to-beat-his-wife, No-hair-on-his-face, Skitty-wa-boo and others. The principal business of Killarney is the fish industry. Tons of fresh fish are shipped daily from here, "but nothing compared at all with what we used to do." The trail of the serpent is over them all, even in this remote region. The largest fish I saw were suckers, and the celerity with which the dusky maiden in the booth on the dock skinned them was marvelous. They gave up their money for knick-nacks of alleged Indian manufacture, confidently believing they had secured bargains. When all were broke they were gathered aboard once more and we turned our backs on Killarney, and headed for Manitowaning, on the north side of Manitoulin island. This place the Indians called the home of the great spirit. It is rightly named, because many of the barrels from Walkerville went ashore here. We also saw several bottled spirits coming aboard and which manifested themselves later in the evening.

Getting away from here we next touched at Little Current, also on the Manitoulin. The dusky damsel with the Indian work was also in evidence here but the crowd had already been touched. At the next stopping place we got off. We intend to take a slower boat going back, as the intense nervous strain was more than we could stand. There were some very pleasant features, however, connected with the trip. We liked the staterooms for one thing. It was impossible to overcrowd them, because two people could not get in at once. We were also taught to guard against the sin of extravagance, by having the supply of towels carefully limited to one for each room for each day. Our room-mate, however, would not be instructed and persisted in using an extra supply which he brought with him. The ventilation, also, was carefully looked after by removing part of the glass from the window. The waiters did their best to make the trip enjoyable by mingling freely among the passengers and even occasionally chipping into the table conversation. So they were readily forgiven when they spilled the soup or forgot what they went after. The cooks, too, did not hide their light (or black) under a bushel, but with their picturesque caps, jackets and aprons, wandered about the cabin. Some reflections were cast upon the cleanliness of their uniforms but then some people are never satisfied. On the whole we felt very much satisfied with our trip and that we had a great deal we had not paid for.

Sault Ste. Marie, Ont., Sept. 8, 1896. Malden.

A number of vessel owners have given orders to the Review to photograph their vessels when passing in the Detriot river at a point where the atmosphere is clear, with no docks or other objectionable features in the back ground. We have stationed the best marine photographer on the lakes on the river to fill these orders. We would be pleased to photograph your boat if you will wire or write us at once. The finished picture will be 11 by 14 inches, mounted on 14 by 17 inch cards. One print $2, three prints $5.

Cargo and Speed Records—Lake Freight Ships.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,569 tons gross or 5,117 net tons, Escanaba to South Chicago, draft of 18 feet. Lake Superior cargoes—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,214 gross or 4,720 net tons, Duluth to Conneaut, draft of 14 feet 8 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000, bushels of corn, Chicago to Buffalo, 16 feet 8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

A note from the Colliery Engineer Co., Scranton, Pa., says: "Our business has not been seriously interfered with on account of the fire in our offices on August 30. Our new offices are on the eighth, ninth and tenth floors of the fire-proof Mears building of this city, and we had the full force of instructors at work within three days after the fire. Fortunately our printing plant was in another building, and we had reserves of all instruction and question papers, drawing plates and other supplies and stationary used in the schools in still another building, and records of students and important files in safes."

Repairs and dock charges on the steel steamer Wm. Chisholm, now in dock of the Cleveland Dry Dock Co., will aggregate nearly $20,000. This does not include the wrecking bill.

"Roper's Land and Marine Engines," bound in morocco with flap and pocket, will be mailed to any address for $3.50 sent to the MARINE REVIEW, Cleveland, O.

Stocks of Grain at Lake Ports.

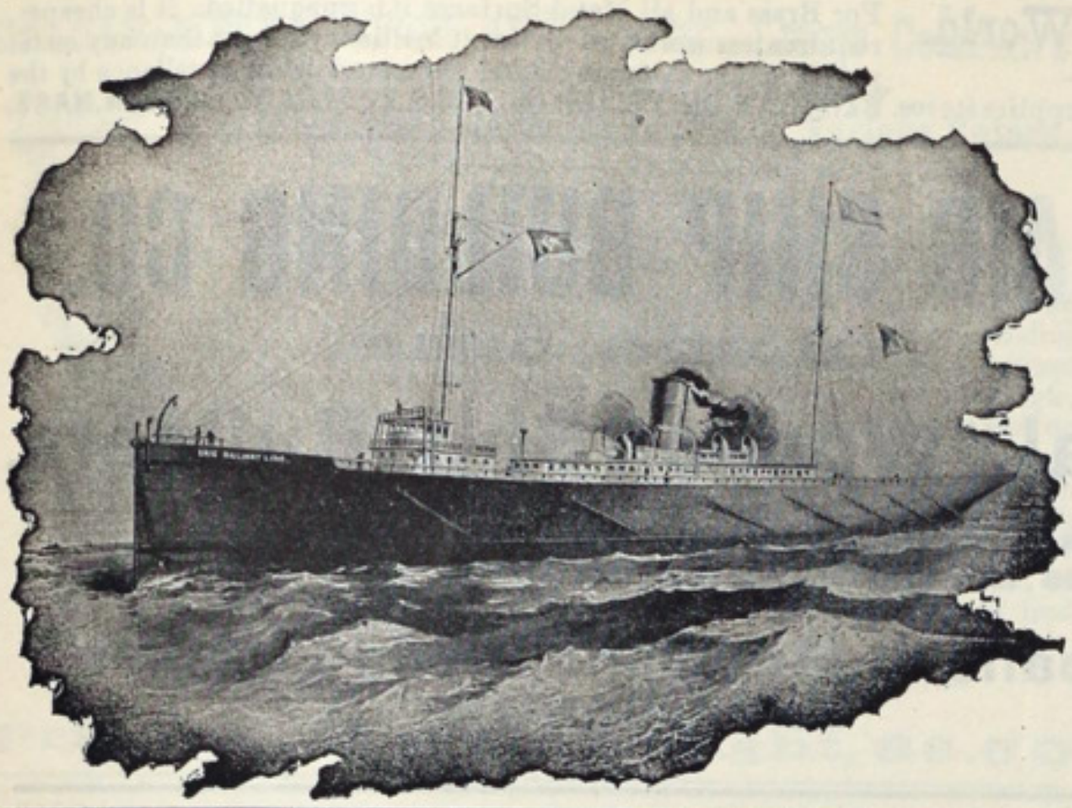
The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes on Sept. 5, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago	12,976,000	5,187,000
Duluth	5,517,000	35,000
Milwaukee	372,000	1,000
Detroit	445,000	16,000
Toledo	713,000	113,000
Buffalo	1,650,000	91,000
Total	21,673,000	5,443,000

As compared with a week ago, the above figures show at the several points named an increase of 1,323,000 bushels of wheat, and a decrease of 866,000 bushels of corn.

Tonnage of the Bessemer company's steamer Siemens, custom house measurement, is 4,344.49 gross and 3,293.08 net. Her official number is 116,732.

Order photographs of vessels, best quality, to be taken on Detroit river, from the Marine Review.



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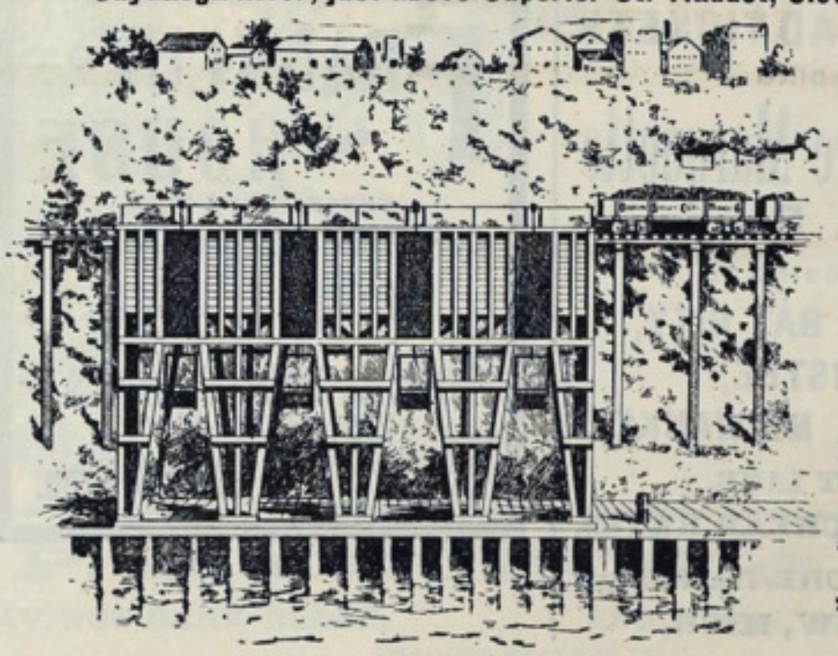

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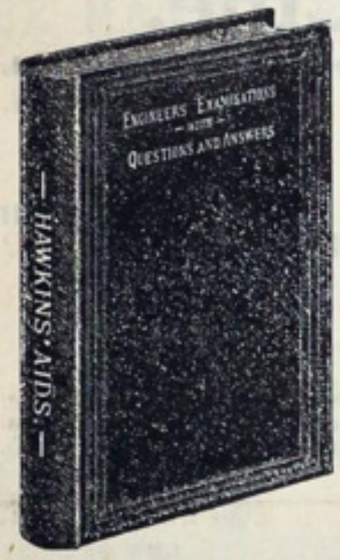

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MARINE REVIEW,
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U. S. ENGINEER OFFICE, 366 Milwaukee St., Milwaukee, Wis., Aug, 17, 1896. Sealed proposals for dredging 122,000 cubic yards, more or less, at Waukegan Harbor, Ill, will be received here until 12 o'clock noon, September 16, 1896, and then publicly opened. Information furnished on application.
Aug 20 Sep 10 GEORGE A. ZINN, Capt. Engrs.

C. E. GROVER, Prest.
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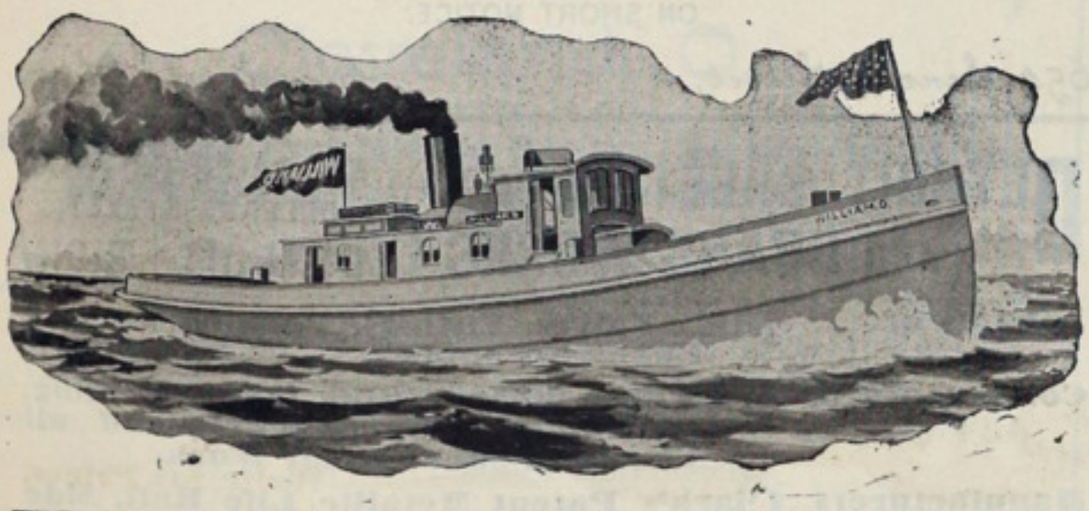

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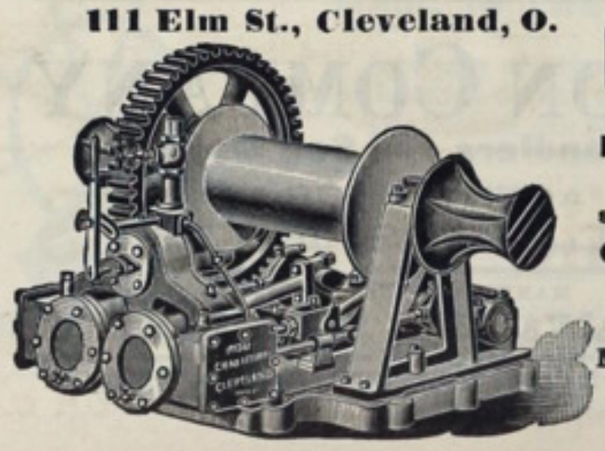

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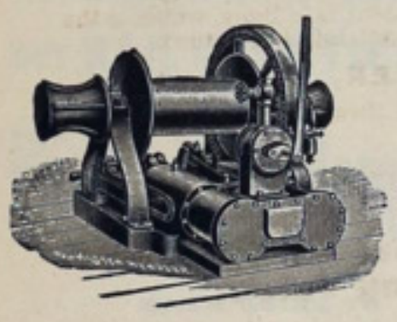

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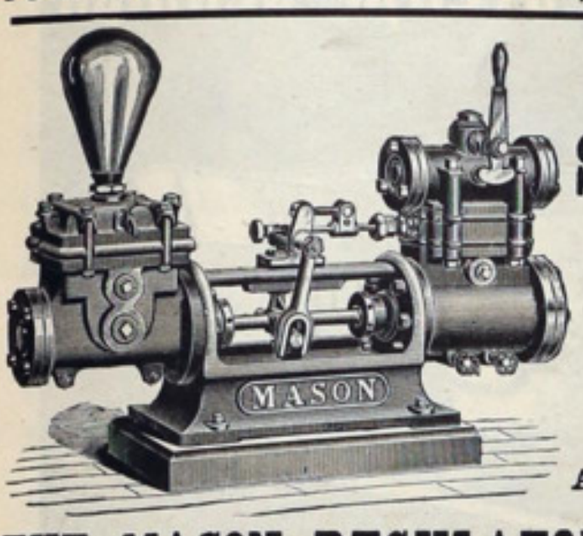

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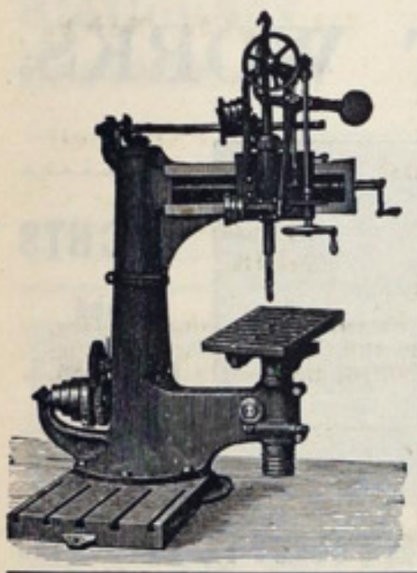

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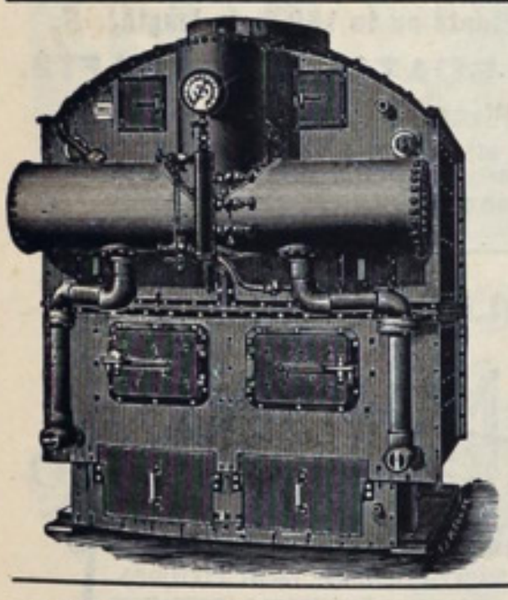

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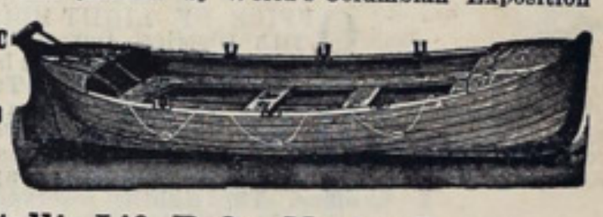

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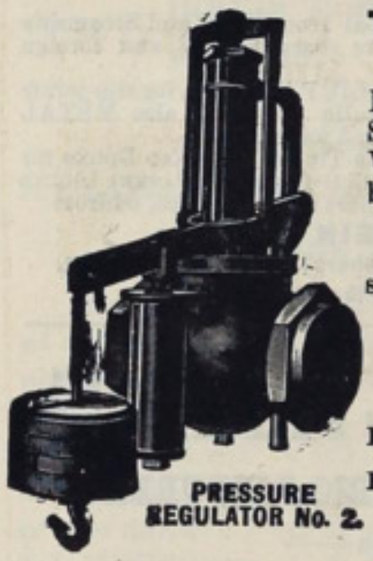

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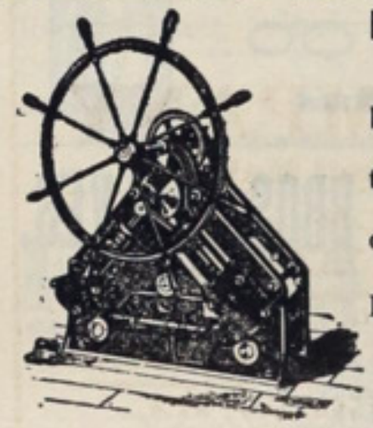

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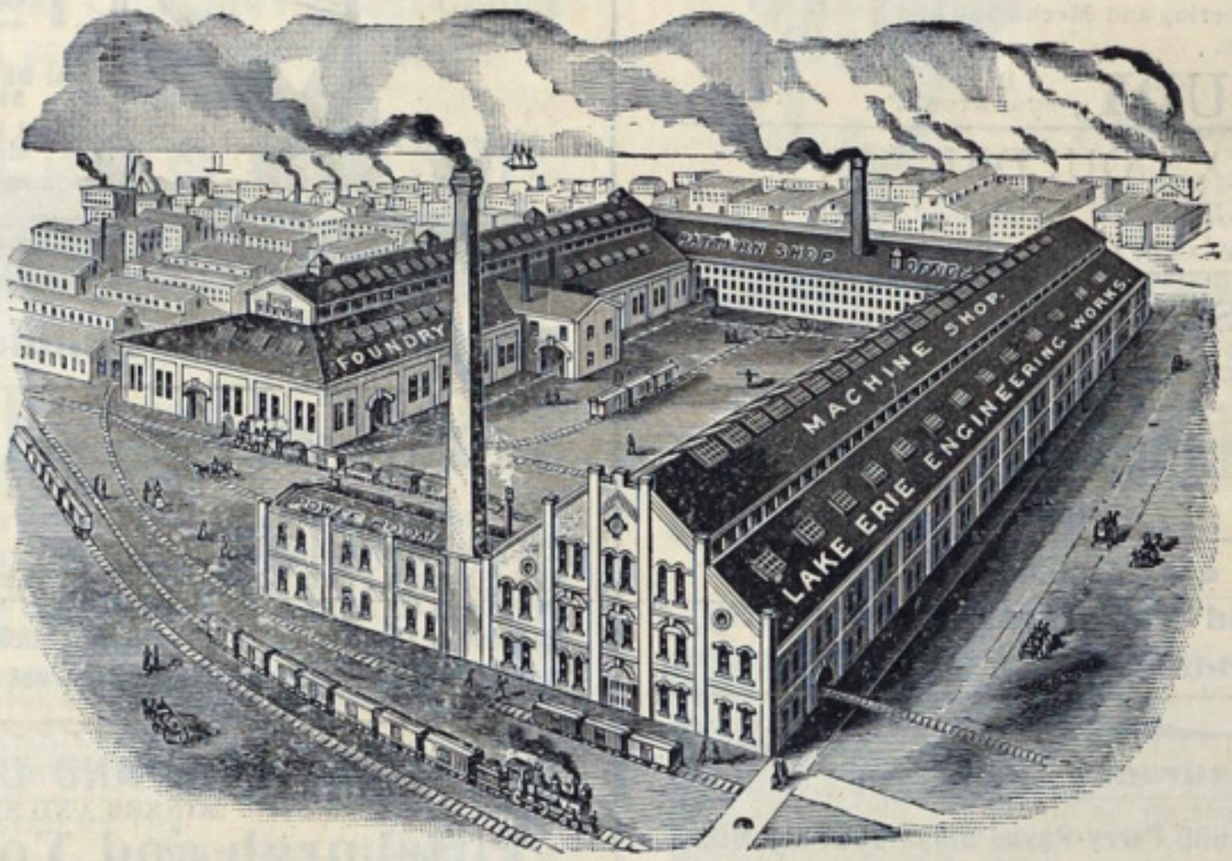

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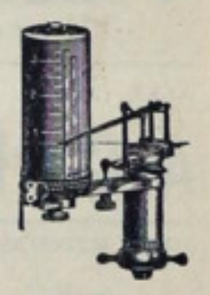

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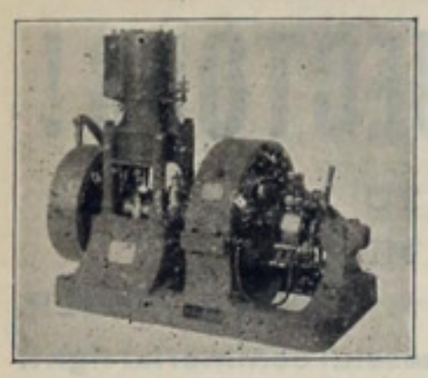

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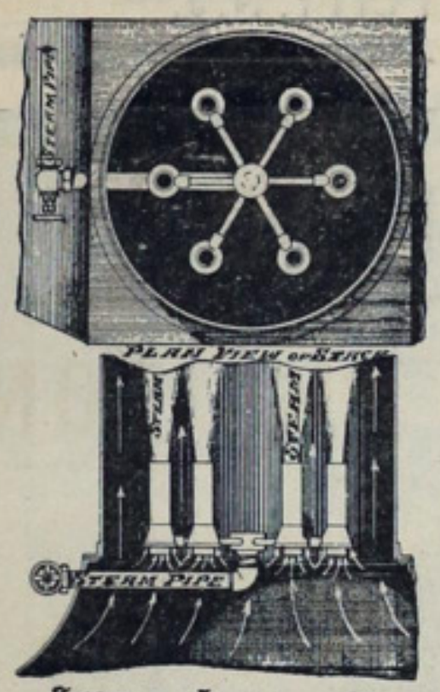

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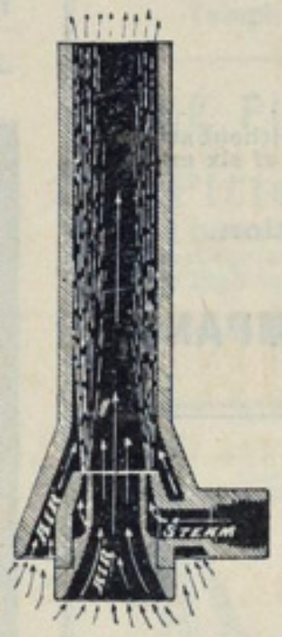

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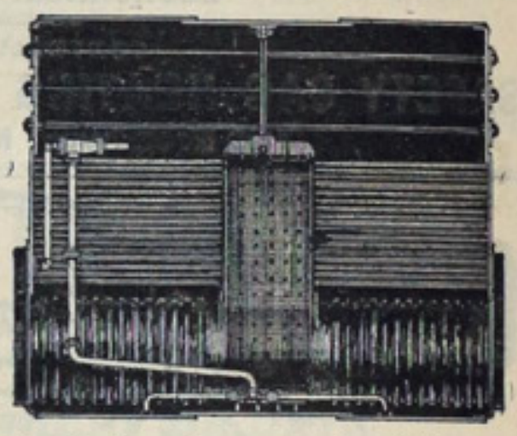

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A. A. SCHANTZ, G. P. A., DETROIT, MICH.

The Detroit and Cleveland Steam Nav. Co.

UNITED STATES ENGINEER OFFICE, 366 Milwaukee street, Milwaukee, Wis., Sept. 1, 1896. Sealed proposals for dredging 70,000 cubic yards, more or less, at Menominee River, Wis., and Mich.; 200,000 cubic yards, more or less, at Green Bay Harbor, Wis., will be received here until 12 o'clock noon. Oct. 6, 1896, and then publicly opened. Information furnished on application. GEORGE A. ZINN, Capt. Engrs.
Oct. 1.

NORTHERN STEAMSHIP CO.
GREAT NORTHERN RAILWAY LINE.

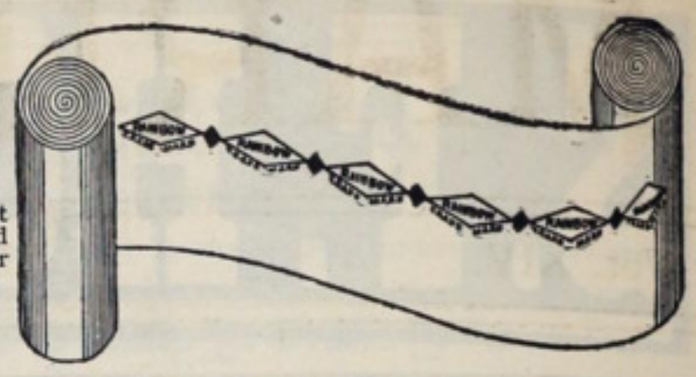
On board Steamship North Land, September 12, 1895.

MR. CHARLES DALE,
President Peerless Rubber Mfg. Co.
New York City.

DEAR SIR.:

I have used Rainbow Packing for steam and hot water pressures of 266 lbs. and 500 to 600 lbs. respectively, and find it superior to all others. Before using Rainbow Packing I tried various other packings, including corrugated copper, and found that they would not hold. I therefore tried Rainbow Packing and can cheerfully recommend it as being the only packing for all high pressures in the market to-day.

Respectfully yours,
HENRY J. REYNOLDS, Chief Engineer Steamship North Land.



RAINBOW

Is the only Packing in the World that will Successfully hold High Pressures.

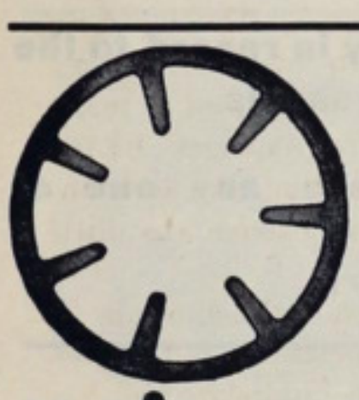
BEWARE OF IMITATIONS.

MANUFACTURED EXCLUSIVELY BY

THE PEERLESS RUBBER MFG. CO.

16 WARREN ST, NEW YORK.

FOR SALE BY THE LEADING SHIP CHANDLERS AND SUPPLY HOUSES.



Serve's Steel Ribbed Boiler and Stay Tubes

Show an average economy in fuel of 15 per cent. In steamers this means not only so much saving in cost of coal or increased power, but additional freight capacity.

☞ **Full Particulars on Application.**

PURVES' RIBBED STEEL BOILER FURNACE FLUE.

With this style of Furnace Flue the rivets at the "back ends" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any part of the boiler. No smithwork is required to fit it on a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of flue has been in use six years without a single complaint.

Over 14,000 of Purves' Ribbed Steel Furnace Flues in successful use 'n Marine Boilers.

Ellis & Eaves System of Induced or Suction Draft.

CHARLES W. WHITNEY, Sole Agent for the United States and Canada, 64, 66, 68 BROADWAY, NEW YORK

AMERICAN STEEL BARGE CO.

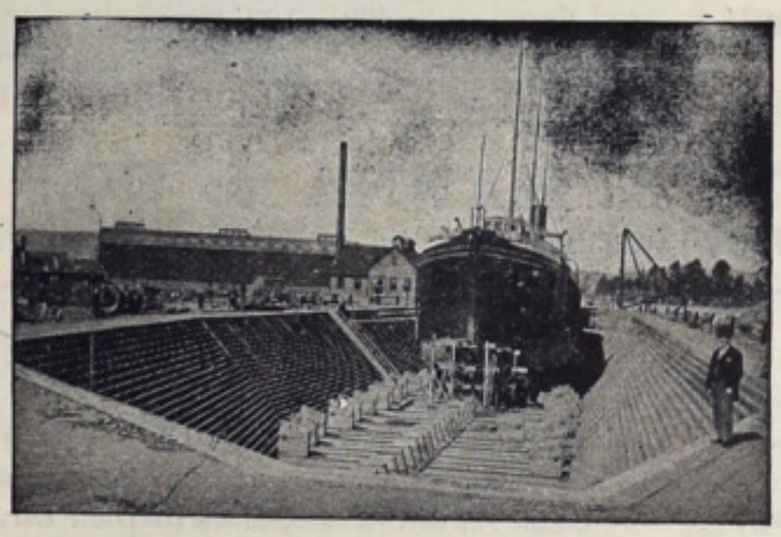
STEEL and METAL SHIPS

Of all classss built on the Shortest Possible Notice at our yards at

West Superior, Wis., and also at Everett, Wash.

Photograph of 300 ft. Boat in Dock.

Plates & Material Always on hand to Repair all kinds of Metal Ships in Shortest Time.



Best Quality of Oak instock for Repairing Wooden Vessels of all Classes.

SIZE OF DOCK.

Length, extreme	537 feet.	Entrance, Top	55 feet 9 in.
Breadth, Top	90 " 4 in.	Entrance, Bottom	50 "
Breadth, Bottom	52 "	Depth over Sills	18 "

LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

SUPERIOR, WIS.

A number of Propellor Wheels in stock at Dry Dock.

H. W. Johns' Boiler and Pipe Coverings.

ASBESTOS MATERIALS OF ALL KINDS,

Wicking, Fibre, Mill Board, Felt, Packing, Cement, Liquid Paints, Roof Paints, Fire-Poof, Paints, etc.

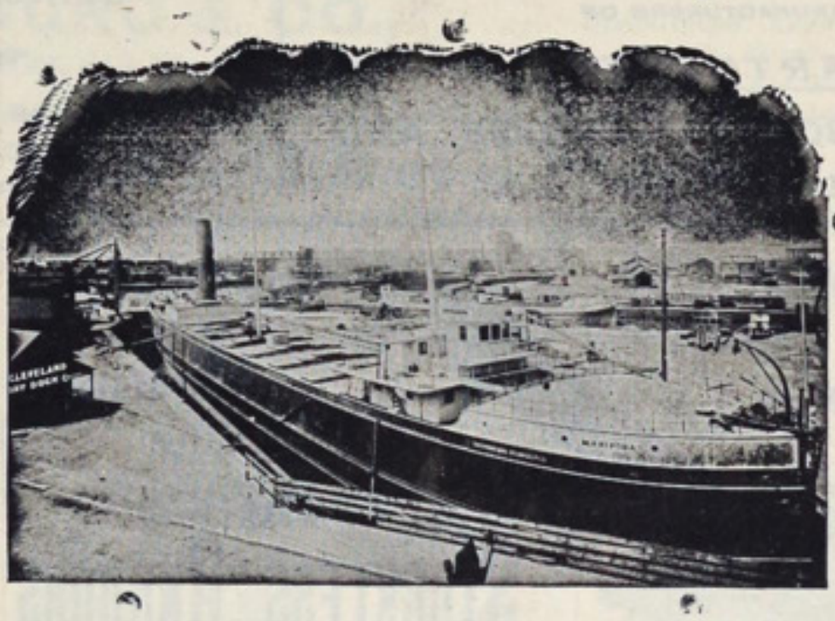
Made in Sections Three Feet Long, to Fit Every Size of Pipe.

ABSOLUTELY FIRE-PROOF.

THE CHASE MACHINE CO. 111 ELM ST. CLEVELAND, O.

H. W. JOHNS MFG. CO. 32 SOUTH WATER ST.

The Cleveland Dry Dock Co.



148 Elm St., Cleveland, O.

Telephone 1616.
Resid. 'Phone 4080.

REPAIRING A SPECIALTY.

Dimensions of Dock:
Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 50 ft.
Depth over sill, 20 ft.

Capt. W. W. BROWN
Sec'y & Mgr.

CLEVELAND CITY FORGE & IRON CO.

CLEVELAND, O.

IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

PROPOSALS FOR DREDGING PLANT.—U. S. Engigeer Office, Morgan Building, Buffalo, N. Y., August 7, 1896. Sealed proposals for furnishing dredging plant in Niagara River will be received here until 11 a. m. September 7, 1896, and then opened. Information furnished on application. T. W. SYMONS, Major, Engrs. Sept. 3.